Patent-Related Tools and Methodology for Use in Research and Development Projects

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Cross-Reference to Other Applications

The present application claims priority to the provisional application entitled, "Patent-Related Tools and Methodology for Use in Research and Development Projects," invented by Paul Germeraad, Provisional Appl. No. 60/128,408, Filed: April 8, 1999 *inactive* (incorporated by reference in its entirety).

The present application is a continuation-in-part application to the following application:

"Intellectual Property Asset Manager (IPAM) for Context Processing of Data Objects," invented by Rivette *et al.*, Appl. No. 09/260,079, Filed: March 2, 1999, now pending (incorporated by reference in its entirety).

The present application is related to the following applications and patents:

"System, Method, and Computer Program Product for Patent-Centric and Group-Oriented Data Processing," invented by Rivette *et al.*, U.S. Patent No. 5,991,751, issued November 23, 1999 from Appl. No. 08/867,392; Filed: June 2, 1997 (incorporated by reference in its entirety);

"Using Hyperbolic Trees to Visualize Data Generated by Patent-Centric and Group-Oriented Data Processing," invented by Rivette *et al.*, Appl. No. 08/921,369; Filed: August 29, 1997, now pending (incorporated by reference in its entirety);

"System, Method, and Computer Program Product for Managing and Analyzing Intellectual Property (IP) Related Transactions," invented by Rivette

et al., Appl. No. 09/138,368; Filed: August 21, 1998, now pending (incorporated by reference in its entirety);

"Method and Apparatus for Synchronizing, Displaying and Manipulating Text and Image Documents," invented by Rivette *et al.*, U.S. Patent No. 5,623,681, issued April 22, 1997, from Application No. 08/155,572, filed November 19, 1993, issued (incorporated by reference in its entirety);

"System and Method and Computer Program Product for Using Intelligent Notes to Organize, Link, and Manipulate Disparate Data Objects," invented by Rivette et al., U.S. Patent No. 5,806,079, issued April 17, 1996 from Appl. No. 08/632,801; Filed: April 17, 1996 (incorporated by reference in its entirety);

"Method and Apparatus for Sychronizing, Displaying and Manipulating Text and Image Documents", invented by Rivette *et al.*, U.S. Patent No. 5,809,318, issued September 15, 1998 from Appl. No. 08/832,971; filed April 4, 1997 (incorporated by reference in its entirety);

"System, Method, and Computer Program Product for Accessing a Note Database Having Subnote Information for the Purpose of Manipulating Subnotes Linked to Portions of Documents," invented by Rivette *et al.*, U.S. Patent No. 5,950,214, issued September 7, 1999 from Appl. No. 09/058,275; Filed: April 10, 1998 (incorporated by reference in its entirety);

"System and Method for Developing and Maintaining Documents," invented by Rivette *et al.*, U.S. Patent No. 5,754,840, issued May 19, 1998, from Application No. 08/590,082, filed January 23, 1996 (incorporated by reference in its entirety);

"System, Method, and Computer Program Product for Generating Equivalent Text Files," invented by Rivette *et al.*, U.S. Patent No. 5,799,325, issued August 25, 1998, from Application No. 08/662,377, filed June 12, 1996 (incorporated by reference in its entirety).

"System, Method, and Computer Program Product for Managing and Analyzing Intellectual Property (IP) Related Transactions," invented by Rivette

et al., Appl. No. 09/138,368; Filed: August 21, 1998, pending (incorporated by reference in its entirety);

"Intellectual Property Asset Manager (IPAM) for Context Processing of Data Objects," invented by Rivette *et al.*, Appl. No. 09/260,079, Filed: March 2, 1999, pending (incorporated by reference in its entirety); and

"System, Method, and Computer Program Product for Creating Subnotes Linked to Portions of Data Objects After Entering an Annotation Mode," invented by Rivette *et al.*, Appl. No. 09/057,557; Filed: April 9, 1998, pending (incorporated by reference in its entirety);

Background of the Invention

Field of the Invention

The invention is generally directed to methodologies related to research and development projects, and more particularly directed to patent-related tools and methodologies involving those tools for assisting in all stages of research and development projects.

Related Art

Research and Development (R&D) projects typically go through a variety of stages before an idea can be commercialized or launched as a final product. A funnel map, as shown in FIG. 1, is the classic way to look at R&D projects. FIG. 1 illustrates that an R&D project may have, but is not limited to, five (5) stages. The first stage is the Idea Stage. Here, the idea is expanded and is prepared for consideration as a formal project/program.

The second stage is the project definition and preliminary assessment stage (hereafter "Preliminary Assessment Stage"). This stage immediately follows the Idea Stage and comprises project definition and preliminary assessment of the

feasibility of the technology and business surrounding the idea or project. The basic questions asked at this stage includes: "Will mother nature let it happen on the technical side?" and "Will consumers be interested on the buy side?"

The purpose of preliminary assessment is to explore new ideas and concepts and set in motion as many promising "seed" ideas or projects as possible. The cost of research and investigation is small at this stage. A single worker may have a project or even work on several projects simultaneously. At this stage, there are typically many avenues being explored and no valid idea is neglected. The main consideration is whether the idea is strategically appropriate, and whether the expertise available to address the idea is adequate and part of the company's core competencies. The output of this stage is the validation of ideas, physical principles and market features. Metrics for this process address the possibility of a market and whether or not basic scientific principles are established.

The next stage relates to the feasibility of technology and business relating to the idea (hereafter "Feasibility Stage"). At this stage the company has tentatively agreed on a particular R&D project. We *believe* that Mother Nature will let it happen, but in this stage the purpose is to *show* that Mother Nature will allow it to happen. Thus, this stage tests whether a concept is validated in the laboratory by making a prototype any way that it can be done. The emphasis is on the proof-of-principle for real business applications.

The Feasibility Stage is also concerned with validating that at least one lead customer might be interested in the technology or idea. Here, business considerations such as market window and competitive reaction begin to be important, although there will still be exploration of options and possible spin-offs of the technology or idea. The "filtration" function at this stage (to go on to the next stage) is fairly strong, since although the cost of research in the Feasibility Stage is still not great, there typically are many more candidate ideas than there are resources to explore them.

The following stage addresses the product development prototyping and market development (hereafter "Development Stage"). Development projects are

carried out for the ideas that are highly promising for commercialization and meet all of the requirements for profitable business products. Here, we are concerned with whether a set of key lead customers will be interested, and not just one lead customer (as in the Feasibility Stage). In addition, candidate technologies in this stage have forecast long-term corporate benefit, and meet all the strategic requirements of fit, alignment, and attractiveness for the business. Emphasis shifts in this stage to harder-edge issues, such as timing and execution to assure that market windows are met and product needs are satisfied. There is also emphasis on maintaining and extending technologies to keep a competitive edge in the marketplace. Milestones are important due to cycle time issues. Project funding must be managed more carefully due to budgets which are typically millions of dollars rather than the 100 times lower investment that may be typical of the Feasibility and Preliminary Assessment Stages.

The final stage involves scale-up and commercial introduction of the product or service that resulted from the initial idea (hereafter "Scale-up Stage"). The Scale-up Stage is the last stage prior to full product launch. Here, the question asked is whether the company will be able to deliver the product with quality and service. Concerns for entering full commercialization are about whether all major manufacturing and distribution hurdles are cleared, and whether commercialization costs allow for profitable entry into the marketplace. Some strategic questions must still be addressed, including market need and timing. Metrics here address both the strategic and tactical issues. Scale-up is obviously market and manufacturing oriented. Careful management of commercialization and product costs, timing, and execution are the key issues. Since budgets up to tens to hundreds of millions of dollars may be at stake, program and resource management are paramount.

Once a business goes through the R&D process for multiple products and/or services a R&D portfolio is created. Typically, a R&D project consists of a written description. This written description has similar elements, such as the purpose of developing the technology, the particular way it will be done, the types of things it may be useful for, and so forth. It is important for a business with

such a portfolio to be able to improve upon its R&D portfolio. One example of how to improve the R&D portfolio has been called Third Generation R&D and the goal is to select and improve upon an R&D portfolio (hereafter "Portfolio Stage"). In order to improve upon an R&D portfolio, it would be helpful to compare a R&D project in the portfolio with existing markets and technologies.

How much time is spent at each of the stages above depends partly on the idea itself. For example, an idea can just be a small deviation from what already exists (e.g., red pens exist and the idea is to make a blue pen), or an idea can be completely on the other side of the spectrum and be a breakthrough idea (e.g., a flying car). For ideas that are small deviations from what already exists, the stages of R&D process are passed through so quickly that one may not even realize they are touching every stage. For breakthrough ideas, one stage may last many years. Here, one loses track of which stage he or she is in because each stage is so drawn out.

It is possible to facilitate, expedite, and enhance R&D projects by building upon work that has been performed in the past. However, there are little if any automated tools for assisting in this process. There are even less automated tools that utilize patent-related tools for assisting in research and development projects.

Summary of the Invention

The present invention is related to patent-related tools, and methodologies involving those tools, for assisting in all stages of R&D projects (see FIGS. 1-3). In the present invention, IPAM server may be used in conjunction with the tools and methodology to aid in R&D projects. The IPAM server can also be used as a support tool for independent inventors. These tools or methods include, but are not limited to, a topographic map, a top company table, a top inventor table, a inventors by company table, a features grouping, a technology classification, a Standard Industrial Codes (SIC) classification, a patent count per year chart, a patent count per year chart, an application count per year chart, a technology by

company map, a patent citation tree, a nested patent citation tree, a product/patent/revenue table, a patent/months to issue chart, and a document/annotation chart.

Further features and advantages of the invention, as well as the structure and operation of various embodiments of the invention, are described in detail below with reference to the accompanying drawings. The drawing in which an element first appears is typically indicated by the leftmost character(s) and/or digit(s) in the corresponding reference number.

Brief Description of the Figures

The present invention will be described with reference to the accompanying drawings, wherein:

FIG. 1 illustrates a funnel map relating to Research and Development projects according to an embodiment of the present invention;

FIG. 2 is an overview of the Research and Development Tools of the present invention that map to each stage in the Research and Development process according to an embodiment of the present invention;

FIG. 3 illustrates the topographic map facilitating the Idea Stage according to an embodiment of the present invention;

FIG. 4 is a flowchart illustrating how the IPAM server works in conjunction with the topographic map to aid in the Idea Stage according to an embodiment of the present invention;

FIG. 5 illustrates the topographic map facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 6 illustrates the topographic map facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 7 illustrates the topographic map facilitating the Development Stage according to an embodiment of the present invention;

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FIG. 8 illustrates the topographic map facilitating the Portfolio Stage according to an embodiment of the present invention;

FIG. 9 illustrates the top company table facilitating the Idea Stage according to an embodiment of the present invention;

FIG. 10 is a flowchart illustrating how the IPAM server works in conjunction with the top company table to aid in the Idea Stage according to an embodiment of the present invention;

FIG. 11 illustrates the top inventor table facilitating the Idea Stage according to an embodiment of the present invention;

FIG. 12 is a flowchart illustrating how the IPAM server works in conjunction with the top inventor table to aid in the Idea Stage according to an embodiment of the present invention;

FIG. 13 illustrates the inventors by company table facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 14 is a flowchart illustrating how the IPAM server works in conjunction with the inventors by company table to aid in the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 15 illustrates the inventors by company table facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 16 illustrates the features grouping facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 17 is a flowchart illustrating how the IPAM server works in conjunction with the features grouping to aid in the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 18 illustrates the features grouping facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 19 illustrates the features grouping facilitating the Development Stage according to an embodiment of the present invention;

FIG. 20 illustrates the technology classification facilitating the Idea Stage according to an embodiment of the present invention;

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FIG. 21 is a flowchart illustrating how the IPAM server works in conjunction with the technology classification to aid in the Idea Stage according to an embodiment of the present invention;

FIG. 22 illustrates the technology classification facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 23 illustrates the technology classification facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 24 illustrates the technology classification facilitating the Development Stage according to an embodiment of the present invention;

FIG. 25 illustrates the technology classification facilitating the Scale-up Stage according to an embodiment of the present invention;

FIG. 26 illustrates the SIC classification facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 27 is a flowchart illustrating how the IPAM server works in conjunction with the SIC classification to aid in the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 28 illustrates the SIC classification facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 29 illustrates the SIC classification facilitating the Development Stage according to an embodiment of the present invention;

FIG. 30 illustrates the patent count per year facilitating the Idea Stage according to an embodiment of the present invention;

FIG. 31 is a flowchart illustrating how the IPAM server works in conjunction with the patent count per year to aid in the Idea Stage according to an embodiment of the present invention;

FIG. 32 illustrates the patent count per year facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 33 is a flowchart illustrating how the IPAM server works in conjunction with the patent count per year to aid in the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 34 illustrates the patent count per year facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 35 illustrates the patent count per year facilitating the Development Stage according to an embodiment of the present invention;

FIG. 36 illustrates the patent count per year facilitating the Scale-up Stage according to an embodiment of the present invention;

FIG. 37 illustrates the map of company patent activity facilitating the Scale-up Stage according to an embodiment of the present invention;

FIG. 38 illustrates the application count per year facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 39 is a flowchart illustrating how the IPAM server works in conjunction with the application count per year to aid in the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 40 illustrates the application count per year facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 41 illustrates the application count per year facilitating the Development Stage according to an embodiment of the present invention;

FIG. 42 illustrates the application count per year facilitating the Scale-up Stage according to an embodiment of the present invention;

FIG. 43 illustrates the technology by company map facilitating the Idea Stage according to an embodiment of the present invention;

FIG. 44 is a flowchart illustrating how the IPAM server works in conjunction with the technology by company map to aid in the Idea Stage according to an embodiment of the present invention;

FIG. 45 illustrates the technology by company map facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 46 illustrates the technology by company map facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 47 illustrates the technology by company map facilitating the Development Stage according to an embodiment of the present invention;

FIG. 48 illustrates the technology by company map facilitating the Scale-up Stage according to an embodiment of the present invention;

FIG. 49 illustrates the patent citation tree facilitating the Idea Stage according to an embodiment of the present invention;

FIG. 50 is a flowchart illustrating how the IPAM server works in conjunction with the patent citation tree to aid in the Idea Stage according to an embodiment of the present invention;

FIG. 51 illustrates the patent citation tree facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 52 illustrates the patent citation tree facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 53 illustrates the patent citation tree facilitating the Development Stage according to an embodiment of the present invention;

FIG. 54 illustrates the nested patent citation tree facilitating the Idea Stage according to an embodiment of the present invention;

FIG. 55 is a flowchart illustrating how the IPAM server works in conjunction with the nested patent citation tree to aid in the Idea Stage according to an embodiment of the present invention;

FIG. 56 illustrates the nested patent citation tree facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 57 illustrates the nested patent citation tree facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 58 illustrates the nested patent citation tree facilitating the Development Stage according to an embodiment of the present invention;

FIG. 59 illustrates the nested patent citation tree facilitating the Scale-up Stage according to an embodiment of the present invention;

FIG. 60 illustrates the product/patent/revenue table facilitating the Portfolio Stage according to an embodiment of the present invention;

FIG. 61 is a flowchart illustrating how the IPAM server works in conjunction with the product/patent/revenue table to issue to aid in the Portfolio Stage according to an embodiment of the present invention;

FIG. 62 illustrates the patent/months to issue facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 63 is a flowchart illustrating how the IPAM server works in conjunction with the patent/months to issue to aid in the Feasibility Stage according to an embodiment of the present invention;

FIG. 64 illustrates the patent/months to issue facilitating the Development Stage according to an embodiment of the present invention;

FIG. 65 illustrates the patent/months to issue facilitating the Scale-up Stage according to an embodiment of the present invention;

FIG. 66 illustrates the patent/months to issue facilitating the Portfolio Stage according to an embodiment of the present invention;

FIG. 67 illustrates the document/annotation facilitating the Idea Stage according to an embodiment of the present invention;

FIG. 68 is a flowchart illustrating how the IPAM server works in conjunction with the document/annotation to aid in the Idea Stage according to an embodiment of the present invention;

FIG. 69 illustrates the document/annotation facilitating the Preliminary Assessment Stage according to an embodiment of the present invention;

FIG. 70 illustrates the document/annotation facilitating the Feasibility Stage according to an embodiment of the present invention;

FIG. 71 illustrates the document/annotation facilitating the Development Stage according to an embodiment of the present invention;

FIG. 72 illustrates the document/annotation facilitating the Scale-up Stage according to an embodiment of the present invention;

FIG. 73 illustrates the document/annotation facilitating the Portfolio Stage according to an embodiment of the present invention; and

FIGs. 74 and 75 illustrate two exemplary sheet shots of the user interface of the present invention according to an embodiment of the present invention.

Detailed Description of the Preferred Embodiments

The present invention is related to patent-related tools, and methodologies involving those tools, for assisting in all stages of research and development projects. FIGS. 1-75 illustrate features of embodiments of the present invention. The pending U.S. applications cited above describe system and methods for achieving the functions, functionality, reports, etc., represented in FIGS. 1-75. Understanding of other methodologies represented in FIGS. 1-75 (and variations and extensions thereof) will be apparent to persons skilled in the relevant art(s) based on the teachings contained herein, and the teachings contained in the patents and pending U.S. applications cited above.

The present invention provides patent-related tools and methodologies for R&D. This may be accomplished through an Intellectual Property Asset Management (IPAM) server, which is described in detail in the patent and applications referenced above in the section entitled "Cross-Reference to Other Patents and Applications." The functionality of the present invention that is described herein as being performed by IPAM server, is not limited to being performed by IPAM server. For example tools such as Excel spreadsheets, the IBM patent server, the USPTO public server, and Manning and Napier's search tools can all be used to perform some or most of the steps of the described methodologies. It is important to note that the exact platform used to perform the methodologies herein is not critical.

IPAM server may be used in conjunction with the tools to aid in R&D. For convenience, IPAM server will briefly be discussed herein, although the invention is not limited to this brief description.

Briefly stated, IPAM server deals with context data processing. IPAM server may be used to define and select one or more contexts. Each context includes one or more attributes, and a plurality of data objects that satisfy the attributes. A list of data objects contained in the selected contexts may be displayed. At least some of the data objects in the selected contexts may be

processed. Such processing may involve generating hierarchical and/or directed acyclic graph data structures to represent relationships among the data objects. These data structures can then be displayed in a variety of well-known techniques including but not limited to hyperbolic trees. Examples of such hierarchical or directed acyclic graph structures include claim trees, citation trees, and data object families, which may be displayed using hyperbolic trees.

In an embodiment, the contexts are groups. In another embodiment, the contexts are each associated with a data object type. In this latter embodiment, the contexts include data objects of their respective data object types.

IPAM server also supports the generation of annotations. IPAM server supports a plurality of annotation types, including document annotations, group annotations, data object type annotations, case annotations, and enterprise annotations. IPAM server also supports form-based annotations.

In an embodiment, IPAM server has a plug-in manager coupled thereto. Also included may be at least one plug-in coupled to the plug-in manager, and at least one external data processing component coupled to the plug-in. In an embodiment, the external data processing component displays data using at least graphs. In another embodiment, the external data processing component displays data using at least maps. The plug-in manager has a first application programming interface (API), and each external data processing component has a second API. The plug-in translates messages from the plug-in manager to the external data processing component to a format conforming to the second API, and translates messages from the external data processing component to the plug-in manager to a format conforming to the first API.

Embodiments of IPAM server can process, display, and otherwise operate with patent equivalent text files (EQV) (or other types of files or data) to aid in R&D, although the invention is not limited to this embodiment. Patent equivalent text files are described in U.S. Patent No. 5,623,681, which is herein incorporated by reference in its entirety. A patent equivalent text file includes equivalency information that establishes an equivalency relationship between the text in the patent equivalent text file and the image in the patent image file. For example, this

equivalency information may include pagination information that enables the patent equivalent text file to be displayed having the same pagination (line breaks, column breaks, page breaks) as the patent image file. In an embodiment, a pagination module generates the patent equivalent text file by comparing the patent text in the patent text file with the patent image file to detect equivalency information. This equivalency information is then embedded in the patent equivalent text file, along with the patent text. While the pagination module is capable of performing the pagination operation automatically, in some cases some manual intervention is required. In accordance, an operator is sometimes involved with the pagination process performed by the pagination module.

In the present invention, IPAM server may be used in conjunction with the tools and methodology to aid in R&D projects. The IPAM server can also be used as a support tool for independent inventors. FIG. 2 is an example overview of the R&D tools that map to each stage in the R&D process (FIG. 1) and in the R& D Portfolio Stage. The mapping provided in FIG. 2 is presented for illustrate purposes only. Other uses and applications of the invention will be apparent based on the teachings contained herein. These tools or methods include (when they are incorporated with IPAM server), but are not limited to, a topographic map 202, a top company table 204, a top inventor table 206, a inventors by company table 208, a features grouping 210, a technology classification 212, a Standard Industrial Codes (SIC) classification 214, a patent count per year chart 216, a patent count per year chart 218, an application count per year chart 220, a technology by company map 222, a patent citation tree 224, a nested patent citation tree 226, a product/patent/revenue table 228, a patent/months to issue chart 230, and a document/annotation chart 232. The following describes each tool or method and how it may be combined with IPAM server to aid in the R&D stages of a product, in addition to the R&D Portfolio Stage. As each of these tools or methods are described below, an exemplary graphical presentation is used. It should be noted that the particular exemplary graphical presentation used is for convenience purposes only and the invention is not limited to that particular graphical presentation. For example, a bar chart can be also implemented as a pie

chart, radar or spider charts, two or three dimensional graphs, etc., and vice versa.

The same tool may be used in different ways to facilitate different stages in R&D. For example, the topographic map 202 (in conjunction with IPAM server) is Tool 1 in the Idea Stage, Tool 10 in the Preliminary Stage, Tool 21 in the Feasibility Stage, Tool 33 in the Development Stage, and Tool 51 in the Portfolio Stage. Other uses of tools will be apparent to persons skilled in the relevant art(s) based on the teachings contained herein.

I.   IPAM Server and the Topographic Map

A.   The Idea Stage

Referring to FIG. 2, IPAM server incorporates the topographic map 202 to facilitate the Idea Stage (as Tool 1), the Preliminary Assessment Stage (as Tool 10), the Feasibility Stage (as Tool 21), the Development Stage (as Tool 33), and the Portfolio Stage (as Tool 51) in the R&D process. How IPAM server and topographic maps are incorporated together to produce contour maps is described in detail in the commonly owned patent application, Intellectual Property Asset Manager (IPAM) for Context Processing of Data Objects, invented by Rivette *et al.*, Appl. No. 09/260,079, Filed: March 2, 1999, now pending (incorporated by reference in its entirety). IPAM server and the topographic map 202 are used in a slightly different way to facilitate each of these stages. FIG. 3 illustrates the topographic map 202 facilitating the Idea Stage as Tool 1, entitled "A Map of Similar Ideas, Art and Markets." As stated above, in the Idea Stage, the idea is expanded and is prepared for consideration as a formal project/product.

In FIG. 3, topographic map 202 as Tool 1 is shown. The purpose of Tool 1 in the Idea Stage is to display a map of preferably patent abstracts that identifies related materials, processes, and uses to consider when expanding and refining the idea. An addition purpose for using Tool 1 at this stage is to provide information relating to whether other individuals or companies are doing similar things and selling them. If so, this demonstrates that the idea is reasonable for a technical and

market standpoint. In addition, the topographical map 202 shows sub-groupings for further exploration of the idea. How the IPAM server works in conjunction with the topographic map 202 to aid in the R&D Idea Stage is described with reference to FIG. 4.

5   In FIG. 4, a flowchart 400 begins at step 402. In step 402, in an embodiment of the present invention a user performs a search on the group of U.S. patents. Here, because the user is just pointing at a broad field, the abstract of each U.S. patent is typically the section that is searched, but is not limited to this. The present invention is not limited to doing the search on U.S. patents (this

10   is also true for all of the searches discussed herein). Here, the search performed is typically, but is not limited to, a boolean and/or natural language search on the idea/subject to produce a group of patents. The user interface of IPAM server is described in detail in the patent and applications referenced above in the section entitled "Cross-Reference to Other Patents and Applications." For illustration,

15   FIGs. 74 and 75 each show a screen shot of IPAM server's user interface relating to the boolean and/or natural language search described herein.

For illustration purposes, assume that the idea involves inkjet printing for cardboard boxes. A boolean and/or natural language search on the keywords "cardboard" and/or "inkjet printing" on the group of all U.S. patents is likely to

20   produce a large number of patents in the idea/subject group of patents. Here, if Tool 1 is not used in conjunction with the IPAM server, the user would typically have to narrow the search to a more manageable number of patents by date, by adding more keywords, and so forth. The goal would be to reduce the number of patents down to a number of patents that the user can study in depth. With the

25   present invention there is no need for the user to further define his or her search. This is illustrated in the following step 404.

In step 404, IPAM server is used to produce a topographic map 202 having a map with contours and labels indicating areas related to the idea//subject searched in step 402. Here, the group of patents produced in step 402 are further

30   subdivided into subgroups, with each subgroup relating to a different area. Typically, this is done by the user selecting a topographic map function on the

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computer screen. The topographic map 202 produced by Tool 1 (FIG. 3) shows the pattern of subjects of all of the patents produced in step 402 (e.g, shows areas related to the user's idea). Labels on the topographic map 202 indicate the idea/subject, and the contours indicate how may U.S. patents exist for each

5   subgroup area. The topographic map 202 shows areas people are focusing on. Control then passes to step 406.

In step 406, the user studies the topographic map 202 produced by Tool 1 and determines whether the exact area of the user's idea/subject is included in the topographic map 202. If the outcome to step 406 is positive, then control

10   passes to step 410. Alternatively, control passes to step 408.

In step 408, an area related to the user's idea/subject was not included in the topographic map 202. Here, the user can determine if another area that is shown in the topographic map 202 is worth further exploration. Using same example as in step 402 above, assume that the topographic map 202 does not

15   show an area relating to inkjet printing for cardboard boxes, but does show an area related to printing on heavy paper stock. Another example is if the cardboard that the user is interested in printing on has a coating on it, as many recycled boxes do, then the user may want to look at the area of printing on plastics or films. The user may be interested in exploring further one or more of these

20   different areas. The present invention also allows the user to explore one or more different areas even if the area relating exactly to the user's idea/subject is displayed. Control then passes to step 410.

In step 410, the user selects the contour (or label) of interest in the topographic map 202. This is typically done by the user "clicking" on the contour

25   of interest. Control then passes to step 412.

In step 412, the IPAM server processes the sub-group of U.S. patents that are included in the contour of interest indicated by the user in step 410. Again, topographic map 202 is displayed with contours, but this time the topographic map 202 is more specific to exactly the user's contour (or area) of interest. Now,

30   the topographic map 202 shows the different types of technologies that are in the contour of interest. In addition, the topographic map 202 may show the different

uses of the idea or area of interest. This indicates to the user whether the initial idea is reasonable from a technical and/or market standpoint. At this point, the user may use the IPAM server as described in detail in the applications and patents referenced above in the section entitled "Cross-Reference to Other Patents and Applications." At this point flowchart 400 ends.

B. The Preliminary Assessment Stage

The topographic map 202, in conjunction with IPAM server, is also useful in the Preliminary Assessment Stage of the R&D process. This is shown in FIG. 5 as Tool 10, and is entitled "A Map of Similar Technology and Uses." The Preliminary Assessment Stage comprises project definition and preliminary assessment of the feasibility of the technology and business surrounding the idea or project. The purpose of Tool 10 is to provide the project team with a high level map of the scope of the project. This includes showing the range of materials, and the processes and uses to consider on the project.

How the IPAM server works in conjunction with the topographic map 202 to aid in the R&D Preliminary Assessment Stage is similar to how it works in the Idea Stage as described with reference to FIG. 4 above. One exception is the initial search in step 402. Instead of searching just the group of U.S. patents as in the Idea Stage, here the search consists of the group of U.S., European, Japanese (and other available) patents and applications. As with Tool 1 (FIG. 3) because the user is still looking at a fairly broad field, the abstract of each patent and application is typically the section that is searched, but is not limited to this. The search itself may also slightly different in that the search is created by a boolean and/or natural language search on project concept (and not just an idea as in step 402), but is not limited to this.

C.   The Feasibility Stage

As shown in FIG. 2, the topographic map 202, in conjunction with IPAM server, is also useful in the Feasibility Stage of the R&D process. In general , the Feasibility Stage tests whether a concept is validated in the laboratory and with at least one lead customer. The topographic map 202 used in conjunction with IPAM server is shown in FIG. 6 as Tool 21, entitled "A Map of Technology and Uses the Project Team is Focused on Refining." The purpose of Tool 21 is to provide the project team and management with a high level map of technologies and markets which are feasible to explore. A map of full patent text identifies art and uses to consider when assessing the feasibility of market and technical alternatives.   How the IPAM server works in conjunction with the topographic map 202 to aid in the R&D Feasibility Stage is similar to how it works in the Idea Stage as described with reference to FIG. 4 above. One exception is the initial search in step 402.   Instead of searching just the group of U.S. patents as in the Idea Stage, here the search consists of the group of U.S., European, Japanese (and other available) patents and applications. Here, because the desired search is starting to narrow as compared to Tools 1 and 10 (where only the abstract was searched), the entire patent is typically searched. The search itself may also slightly different in that the search is created by a boolean and/or natural language search on project concept (and not just an idea as in step 402), but is not limited to this.

D.   The Development Stage

As shown in FIG. 2, the topographic map 202, in conjunction with IPAM server, is also useful in the Development Stage of the R&D process. In general, in the Development Stage candidate technologies determined from the Feasibility Stage have forecast long-term corporate benefit, and meet all the strategic requirements of fit, alignment, and/or attractiveness for the business.   The topographic map 202 used in conjunction with IPAM server is shown in FIG. 7

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as Tool 33, entitled "Map of Competitive Technology and Uses." The purpose of Tool 33 is to provide the project team and management with a high level map of technologies and markets which are: (1) under development and/or (2) potentially competitive. A map of patent claims identifies related technologies and companies to work around and block out in the Scale-up Stage. In addition, Tool 33 helps to indicate to a company who the competitors are in a particular area. This map also allows you to do time slices indicating who has entered the market and in which years or time slices. This indicates those companies on which competitive intelligence should be performed.

How the IPAM server works in conjunction with the topographic map 202 to aid in the R&D Development Stage is similar to how it works in the Idea Stage as described with reference to FIG. 4 above. One exception is the initial search in step 402. Instead of searching just the group of U.S., European, Japanese (and other available) patents and applications, as in the Idea Stage, here the search consists of the group of all patents, applications and documents narrowed to reflect the project concept under development. Here, because the desired search is more narrow than the search with Tool 21, the entire patent is typically searched. For example, in the Development Stage, if the user was concerned about infringing patents, the search may focus on only the claims of each patent. The search itself is also slightly different in that the search is created by a boolean and/or natural language search on project elements (and not just an idea as in step 402), but is not limited to this.

E.   Scale-up Stage

The topographic map 202, in conjunction with IPAM server, is also useful in the Scale-up Stage (not indicated in FIG. 2) by providing analysis that will not only increase the strength of any patent applications that are filed on the idea, but also increase the probability of an earlier, successful patent prosecution. The topographic map 202, in conjunction with IPAM server, helps to identify technical fields that the U.S. Patent and Trademark Office and other competitors will search

for prior art to be used against the patent application during prosecution. How the IPAM server works in conjunction with the topographic map 202 to aid in the R&D Scale-up Stage is similar to how it works in the Idea Stage as described with reference to FIG. 4 above. The one exception is that the group searched in step 402 is all patents and applications narrowed to reflect the developing product, but is not limited to this.

F. Portfolio Stage

As shown in FIG. 2, the topographic map 202, in conjunction with IPAM server, is also useful in the Portfolio Stage, which occurs after the R&D process. Once a business goes through the R&D process for multiple products and/or services a R&D portfolio is created. Typically, a R&D project consists of a written description. This written description has similar elements as a patent, such as the propose of developing the technology, the particular way it will be done, the types of things it may be useful for, and so forth. It is important for a business with such a portfolio to be able to improve upon its R&D portfolio. In order to improve upon a R&D portfolio, the present invention allows a company to compare a R&D project in the portfolio with existing markets and technologies. The topographic map 202 used in conjunction with IPAM server is shown in FIG. 8 as Tool 51, entitled "Map of Company Competency & New Projects." The purpose of Tool 51 is to provide the management of a company visual image of core competencies and future directions. In addition, it maps core competencies of the company and allows the user to also map new projects under consideration for R&D portfolio to the core competencies of the company.

How the IPAM server works in conjunction with the topographic map 202 to aid in the Portfolio Stage is similar to how it works in the Idea Stage as described with reference to FIG. 4 above. One exception is the initial search in step 402. Instead of searching the group of all U.S., European, Japanese (and other available) patents and applications as in the Idea Stage, here the search consists of a more limited group of patents that include the company's patents,

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product descriptions and suggested project ideas. The search consists of assignee searches on the company (which is different from the search performed in step 402).

Referring to FIG. 8, Tool 51 allows the user to add R&D project information to a group of patents to determine where on the topographic map 202 its R&D projects fall. This indicates such things as: is the R&D project going to be competing with an active or crowed area (and thus more competition), or will the R&D project going to be competing in an explored area, and so forth. This is a very powerful tool for portfolio reviewers which typically includes the top management of a company. This is very powerful when a company is making a portfolio decision about which R&D project to push forward on and which to drop. Many times it depends on the strategy of the company. One strategy is to capture explored areas. If the topographic map 202 indicates that a R&D project will be headed to a crowded area, at least it will be a deliberate and expected outcome when competition is tough. Tool 51 allows a strategic planning team to, at a glance, make a rational decision without having to look at -- in the case of our inkjet printers on cardboard, example thousands of patents.

II.   IPAM Server and the Top Company Table

Referring to FIG. 2, IPAM server works in conjunction with the top company table 204 to facilitate the Idea Stage in the R&D process. FIG. 9 illustrates an example top company table 204 facilitating the Idea Stage as Tool 2, entitled "A Table of Assignees." A similar chart is shown in FIG. 37 as Tool 53 (in three dimensional). As stated above, in the Idea Stage, the idea is expanded and is prepared for consideration as a formal project/product.

In FIG. 9, top company table 204 as Tool 2 is shown. The purpose of Tool 2 in the Idea Stage is to display a table that provides a patent count report of the assignees or companies that are somehow involved in areas related to the idea. This helps to provide information relating to the quality and variety of top companies who are also active in areas surrounding the idea. The table of

assignees gives new ideas on technology and markets to consider when expanding and refining the idea. How the IPAM server works in conjunction with the top company table 204 to aid in the R&D Idea Stage is described with reference to FIG. 10.

5   In FIG. 10, a flowchart 1000 begins at step 1002. In step 1002, in an embodiment of the present invention a user performs a search on the group of all U.S. patents. Here, because the user is just pointing at a broad field, the abstract of each U.S. patent is typically the section that is searched, but is not limited to this. The present invention is not limited to doing the search on U.S. patents, but

10   may include European, Japanese (and other available) patents and/or applications. Here, the search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 1004.

     In step 1004, IPAM server generates a top company table 204 that indicates the top assignees/companies in a related area to the idea/subject searched

15   in step 1002. Here, the group of patents produced in step 402 are further subdivided into subgroups, with each subgroup having the same assignee/company. IPAM server may store the assignee information of patents in a meta-data field that will also need to be searched to determine the assignee/company information, but is not limited to this.

20   Typically, step 1004 is initiated by the user selecting a top company function on the computer screen. The top company table 204, produced in conjunction with IPAM server and Tool 2 (FIG. 9), shows the quality and variety of top companies who are also active in areas surrounding the idea. At this point flowchart 1000 ends.

25   Note that in the Idea Stage, a user may decide to combine or integrate one or more tools to facilitate the stage. For example, once the group of patents (from the search in step 1002) is divided into subgroups (in step 1004), the user may use Tool 1 to produce the topographic map 202 and/or Tool 2 to produce the top company table 204. The integration and combination of tools discussed herein to

30   facilitate the R&D stages is limitless and particular combinations useful to particular applications will be apparent to persons skilled in the relevant arts based

on the techniques contained herein. Following is a general discussion describing how a company would use Tool 2 (FIG. 9) to facilitate the Idea Stage.

Referring to FIG. 9, the example idea involves "microwave food heating." What FIG. 9 shows is the ranking of companies in terms of *frequency* of patents, from the largest (in this example, Mitsushita Electric Industrial Co., Ltd., Raytheon Company, and General Electric Company are the top companies) to the smallest (companies/individuals who only have one patent). Assuming the user has an understanding of what different companies do, the user can go down the list of companies in the top company table 204 and get a feeling for how the company is involved in areas related to the idea.

For example, due to the nature of Matsushita Electrical Industrial Co., Ltd., Raytheon Company and General Electric Company, one can assume that these companies are making microwave ovens. The James River Corporation is a packaging company, and thus it is likely to be making the packages for microwave ovens. As the user goes through the list, it gives him or her a feeling for the companies who are working in the area of microwave food heating. Therefore, because of what a user knows, the user gets an idea about the technology each company is likely to apply, which market segments they are likely to be going into, and so forth. This facilitates the Idea Stage because it gives the user new ideas and markets.

Another way to use Tool 2 is as follows. Again, top company table 204 shows the quality and variety of top companies who are also active in areas surrounding the idea. If the most active companies are large companies, it gives the user the indication that if the user wants to develop the idea himself or herself, then he or she may have a struggle in breaking into related or the same area. If this is the case, the user may decide to approach one or more of the top companies and sell the idea, suggest a partnership, license a patent that relates to the idea, and so forth. At the bottom of the top company table 202 are companies or individuals who own one patent in the area. This indicates to the user that although the company/individual expended enough energy to get a patent, chances are the patent was never pursued. This presents a good source of

companies/individuals to approach to either buy their patent or license their patent.

III.   IPAM Server and the Top Inventor Table

Referring to FIG. 2, IPAM server works in conjunction with the top inventor table 206 to facilitate the Idea Stage in the R&D process. FIG. 11 illustrates an example top inventor table 206 facilitating the Idea Stage as Tool 3, entitled "A Table of Inventors." In general, the top inventor table 206 identifies leading inventors, allows companies to compare their own inventors to other inventors in the same market, and tracks inventor movement between companies.

In FIG. 11, top inventor table 206 as Tool 3 is shown. As stated above, in the Idea Stage, the idea is expanded and is prepared for consideration as a formal project/product. The purpose of Tool 3 in the Idea Stage is to display a table that provides a patent count report of the inventors that are somehow involved in areas related to the idea. This helps to provide information relating to the quality and variety of top inventors who are also active in areas surrounding the idea. The top inventor table 206 identifies people who have worked in the area and therefore provides suggestions as to other types of searches to perform (e.g., literature searches on the top inventors). How the IPAM server works in conjunction with the top inventor table 206 to aid in the R&D Idea Stage is described with reference to FIG. 12.

In FIG. 12, a flowchart 1200 begins at step 1202. In step 1202, in an embodiment of the present invention a user performs a search on the group of all U.S. patents. Here, because the user is just pointing at a broad field, the abstract of each U.S. patent is typically the section that is searched, but is not limited to this. The present invention is not limited to doing the search on U.S. patents, but may include European, Japanese (and other available) patents and/or applications. Here, the search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 1204.

In step 1204, IPAM server generates a top inventor table 206 that indicates the top inventors in a related area to the idea/subject searched in step 1202. Here, the group of patents produced in step 1202 are further subdivided into subgroups, with each subgroup having the same inventor. As with assignee information, IPAM server may store the inventor information of patents in a meta-data field that will also need to be searched to determine the inventor information, but is not limited to this.

Typically, step 1204 is initiated by the user selecting a top inventor function on the computer screen. The top inventor table 206, produced in conjunction with IPAM server and Tool 3 (FIG. 11), shows the quality and variety of top inventors who are also active in areas surrounding the idea. At this point flowchart 1200 ends.

As noted above, once the group of patents (from the search in step 1202) is divided into subgroups (in step 1204), the user may also use Tool 1 to produce the topographic map 202 and/or Tool 2 to produce the top company table 204 (to indicate the companies each inventor has worked for).

A general discussion describing how a company would use Tool 3 (FIG. 11) to facilitate the Idea Stage will now be described. Referring to FIG. 11, the example idea involves "microwave food heating." What FIG. 11 shows is the ranking of inventors in terms of *frequency* of patents, from the most (in this example, Melvin L. Levinson) to the least. Looking at the top inventor table, the user notices there are multiple inventors with over thirteen (13) patents. This indicates that these inventors have been practicing the art for some time. If the top inventor table 206 shows that no inventor has more than three (3) patents, this indicates nobody has really been in the field enough to build up a patent portfolio related to the idea. And then there's some cases where you'll find a person(s) with fifty (50) patents in an area, indicating potential experts in the field.

What is important is that people who tend to patent a lot also tend to publish. And so *this* table identifies people who've worked in the area, and you should run literature searches on them, that is, non-patent searches. These are people on which to perform competitive intelligence. Which societies are they

members of? Why are they interested in that? And which kinds of other journal articles have they written? Depending upon the quality of the journal (an example well regarded journal being the *Journal of the American Chemical Society)*, the user gets an idea on how solid the inventor's technical work is. If the inventor's work is solid, then the inventor is likely to have a good understanding of that field. Whereas if the user runs a literature search and the user finds out that the inventor is publishing mostly in the trade magazines, the user knows that although the inventor is patenting a lot, there is perhaps not as much depth and understanding of the idea in that person.

The depth and understanding of inventors in areas related to the user's idea is helpful to know for a number of reasons, such as the following. Say the user has come up with a really unique way of doing a particular job. The user wants to be able to predict what the chances are that one of these inventors listed in the top inventor table 206 (FIG. 11) is going to stumble on the same unique way. It there is little chance that one of the inventors will stumble on the same unique way, it's reasonable for the inventor to pursue the project. Or on the other hand, if the user finds an inventor who is really studying the field, and is a good, scientific, and rigorous thinker, the user might want to consider who might be in that area, and what might blindside the user's project. One question the user is asking in the Idea Stage includes: Is my idea solid and thus worth pursuing?

IV. IPAM Server and the Inventors By Company Table

Referring to FIG. 2, IPAM server works in conjunction with the inventors by company table 208 to facilitate the Preliminary Assessment Stage (as Tool 11) and the Feasibility Stage (as Tool 22) in the R&D process. As will be apparent from the description below, inventors by company table 208 is an integration/combination of the top company table 204 and the top inventor table 206.

A.   *Preliminary Assessment Stage*

The inventors by company table 208, in conjunction with IPAM server, is useful in the Preliminary Assessment Stage of the R&D process. This is shown in FIG. 13 as Tool 11 and is called "A Table of Inventors by Assignee." The Preliminary Assessment Stage comprises project definition and preliminary assessment of the feasibility of the technology and business surrounding the idea or project. The purpose of Tool 11 is to show which top individuals, at what companies, may be resources for the project team. Tool 11 identifies people who have worked in the idea area, and therefore who to run literature searches on and potentially establish partnership contracts with. How the IPAM server works in conjunction with the inventors by company table 206 to aid in the R&D Preliminary Assessment Stage is described with reference to FIG. 14.

In FIG. 14, a flowchart 1400 begins at step 1402. In step 1402, in an embodiment of the present invention a user performs a search on the groups of all U.S. and European patents. Here, because the user is just pointing at a broad field, the abstract of each U.S. patent is typically the section that is searched, but is not limited to this. The present invention is not limited to doing the search on U.S. patents, but may include Japanese (and other available) patents and/or applications. Here, the search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 1404.

In step 1404, the group of patents produced in step 1402 are further divided into subgroups, with each subgroup having the same inventor. IPAM server may store the inventor information of patents in a meta-data field that will also need to be searched to determine the inventor information, but is not limited to this. Control then passes to step 1406.

In step 1406, each subgroup produced in step 1404 is further divided into subgroups by assignee/company. IPAM server may store the assignee information of patents in a meta-data field that will also need to be searched to determine the assignee information, but is not limited to this. The flowchart 1400 ends at this

point. Following is a general discussion describing how a company would use Tool 11 (FIG. 13) to facilitate the Preliminary Assessment Stage.

Referring to FIG. 13, the example idea involves "microwave food heating." What FIG. 13 shows is the ranking of inventors, by company, in terms of *frequency* of patents. The types of information the user can derive from viewing FIG. 13 includes, not only knowing which companies you may want to create a partnership with, but which individuals in the companies you would want to work with.

The other information that Tool 11 provides to the user is an indication of partnerships between the different companies that is not public information. Some inventors will show up as working for more than one assignee (company). In other words, they've done work, and they'll show up as having filed with several different companies. In this case two things may have happened. Either the inventor has switched jobs; or the two companies have a partnership working in the area. If one or two inventors have the same set of companies listed together, the inventor probably just switched jobs. On the other hand, if the inventors by company table 208 shows 3, 10, or 15 people that have the same pairings of companies, this indicates that there has been an inter-company partnership formed to work in that area.

The *key* point about the business process to make here, is that when the user sees this, he or she knows that there is a partnership between the companies. This can be valuable competitive intelligence information, because many times there will be partnerships formed that show up in these patents that are *not* publically announced. The types of companies that team up together in a particular area may be an indication of the types of products the user will have to compete with in the future.

B.   *Feasibility Stage*

As shown in FIG. 2, the inventors by company table 208, in conjunction with IPAM server, is also useful in the Feasibility Stage of the R&D process. In

general, the Feasibility Stage tests whether a concept is validated in the laboratory and with at least one lead customer. The inventors by company table 208, used in conjunction with IPAM server, is shown in FIG. 15 as Tool 22, entitled "A Table of Inventors by Assignee." The purpose of Tool 22 is to show which individuals may be resources for the project team, and which to commence competitive intelligence on.

How the IPAM server works in conjunction with the inventors by company table 208 to aid in the R&D Feasibility Stage is similar to how it works in the Preliminary Assessment Stage as described with reference to FIG. 13 above. One exception is the initial search in step 1402 (FIG. 14). Instead of searching just the groups of U.S. and European patents as in the Preliminary Assessment Stage, here the search consists of the group of U.S. patents, European patents and European applications, but is not limited to this.

V. IPAM Server and Features Grouping

Referring to FIG. 2, IPAM server works in conjunction with the features grouping chart 210 to facilitate the Preliminary Assessment Stage (as Tool 12), the Feasibility Stage (as Tool 23) and the Development Stage (as Tool 34) in the R&D process.

A. Preliminary Assessment Stage

The features grouping chart 210, in conjunction with IPAM server, is useful in the Preliminary Assessment Stage of the R&D process. This is shown in FIG. 16 as Tool 12 and is called "Groupings of Proposed Product Features." The Preliminary Assessment Stage comprises project definition and preliminary assessment of the feasibility of the technology and business surrounding the idea or project. The purpose of Tool 12 is to uncover distinctive and sometimes known product feature sets early in a project. Tool 12 expands possible alternative customer features to be considered by the project team. How the

IPAM server works in conjunction with the features grouping chart 210 to aid in the R&D Preliminary Assessment Stage is described with reference to FIG. 17.

In FIG. 17, a flowchart 1700 begins at step 1702. In step 1702, in an embodiment of the present invention a user performs a search on the groups of corporate and patent documents. The present invention is not limited to doing the search on corporate and patent document, but may include other available documents. Here, the search performed is typically a boolean and/or natural language search on product attributes which are sorted and grouped. Control passes to step 1704.

In step 1704, IPAM server is used in conjunction with the features grouping 210 to create a chart showing groupings of proposed product features. The chart in FIG. 16 expands possible alternative customer features to be considered by the project team.

B. Feasibility Stage

The features grouping chart 210, in conjunction with IPAM server, is also useful in the Feasibility Stage of the R&D process. This is shown in FIG. 18 as Tool 23 and is called "Map of Which Proposed Product Features Are Feasible." The purpose of Tool 23 is to find product feature sets early in the project via previous internal research and partner's research. Tool 23 also highlights distinctive features needed by customers in a way that they can be prioritized and traded-off. How the IPAM server works in conjunction with the features grouping chart 210 to aid in the R&D Feasibility Stage is similar to how it works in the Preliminary Assessment Stage as described with reference to FIG. 17 above.

C. Development Stage

The features grouping chart 210, in conjunction with IPAM server, is also useful in the Development Stage of the R&D process. This is shown in FIG. 19 as Tool 34, entitled "Map of achievable Product and Service Features." The

purpose of Tool 34 is to visualize and present product feature sets to the review team in a dynamic form. How the IPAM server works in conjunction with the features grouping chart 210 to aid in the R&D Feasibility Stage is similar to how it works in the Preliminary Assessment and Feasibility Stages as described with reference to FIG. 17 above.

VI.   IPAM Server and Technology Classification

Referring to FIG. 2, IPAM server works in conjunction with the technology classification 212 to facilitate the Idea Stage (as Tool 4), the Preliminary Assessment Stage (as Tool 13), the Feasibility Stage (as Tool 24), the Development Stage (as Tool 35) and the Scale-up Stage (as Tool 44) in the R&D process.

A.   Idea Stage

FIG. 20 illustrates the technology classification 212 facilitating the Idea Stage as Tool 4, entitled "A Chart of Similar Technologies." As stated above, in the Idea Stage, the idea is expanded and is prepared for consideration as a formal project/product.

In FIG. 20, technology classification 212 as Tool 4 is shown. The purpose of Tool 4 in the Idea Stage is to provide the necessary information to the user (e.g., inventor of the idea) as to what other technologies might be used to build upon the initial concept. In addition, Tool 4 identifies technical fields that possibly impinge on the idea. How the IPAM server works in conjunction with the technology classification 212 to aid in the R&D Idea Stage is described with reference to FIG. 21.

In FIG. 21, a flowchart 2100 begins at step 2102. In step 2102, in an embodiment of the present invention a user performs a search on the group of all U.S. patents. Here, because the user is just pointing at a broad field, the abstract of each U.S. patent is typically the section that is searched, but is not limited to

this. The present invention is not limited to doing the search on U.S. patents, but may include European, Japanese (and other available) patents and/or applications. Here, the search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 2104.

5   In step 2104, IPAM server takes the group of patents produced in step 2102 and further divides it into subgroups, with each subgroup having the same technology classification. When the search in step 2102 is on the group of U.S. patents, the classification used is the U.S. Patent Classification designated by the U.S. Patent and Trademark Office. In a similar manner, if the search in step 2102 is on the group of International patents, then the classification used would be the IPC classification. IPAM server may store the U.S. Patent Classification (or IPC classification) a meta-data field that will also need to be searched to determine the technology classification, but is not limited to this. Control then passes to step 2106.

      In step 2106, IPAM server is used in conjunction with a technology classification 212 to create a graphical representation of similar technologies. Typically, this is done by the user selecting a technology classification function on the computer screen. The technology classification 212 produced by Tool 4 (FIG. 20) shows the diverse technologies (via U.S. Patent Classifications) that might be used to build upon the initial idea. The graphical representation in FIG. 20 is a pie chart. The present invention is not limited to using a pie chart, but could also use radar or spider charts, two or three dimensional graphs, etc.

      Referring to FIG. 20, the U.S. Patent Classification 395 represents the most common type of technology that can be used to implement the idea. The most common type of technology is typically the lowest cost. The most unique technologies that can be used to implement the idea are shown by the smallest slivers in the pie chart of FIG. 20. The most unique technologies generally indicate technologies that the user may not have thought of without the present invention. It is important to keep in mind that Tool 4 is used in the Idea Stage and the user is concerned with whether his or her idea makes any initial sense to pursue.

B.   *Preliminary Assessment Stage*

FIG. 22 illustrates the technology classification 212 facilitating the Preliminary Assessment Stage as Tool 13, entitled "A Chart of Similar Technologies." The purpose of Tool 13 in the Preliminary Assessment Stage is to

5   provide the necessary information to the project team as to what other technologies should be considered for the idea. In addition, what technologies are being used by other competitors. In addition, Tool 13 identifies technical fields that produce similar feature sets. How the IPAM server works in conjunction with the technology classification 212 to aid in the R&D Preliminary Assessment Stage

10   is similar to how it works in the Idea Stage as described with reference to FIG. 21 above. The one exception is that the group searched in step 2102 also includes European and Japanese (or any other) Patents and Applications, in addition to U.S. Patents, but is not limited to this.

C.   *Feasibility Stage*

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FIG. 23 illustrates the technology classification 212 facilitating the Feasibility Stage as Tool 24, entitled "A Chart of Similar Technologies." The purpose of Tool 24 in the Feasibility Stage is to define what other technologies

20   might be feasible and considered by technical and market teams. In addition, Tool 24 identifies technical fields that produce similar feature sets, which the project team must evaluate for trade-offs. How the IPAM server works in conjunction with the technology classification 212 to aid in the R&D Feasibility Stage is similar to how it works in the Idea Stage as described with reference to FIG. 21

25   above. The one exception is that the group searched in step 2102 also includes European and Japanese (or any other) Patents and Applications, in addition to U.S. Patents, but is not limited to this.

D. Development Stage

FIG. 24 illustrates the technology classification 212 facilitating the Development Stage as Tool 35, entitled "Map of Similar Technologies." The purpose of Tool 35 in the Development Stage is to make the project team aware of strengths and weaknesses of not only its approach, but also competitive approaches. In addition, Tool 35 identifies technical fields that produce similar feature sets, which the project team must evaluate for its final solution and possible competitive approaches. How the IPAM server works in conjunction with the technology classification 212 to aid in the R&D Development Stage is similar to how it works in the Idea Stage as described with reference to FIG. 21 above. The one exception is that the group searched in step 2102 is all patents and applications narrowed to reflect project concept under development, but is not limited to this.

E. Scale-up Stage

FIG. 25 illustrates the technology classification 212 facilitating the Scale-up Stage as Tool 44, entitled "A Chart of Similar Technologies." The purpose of Tool 44 in the Scale-up Stage is to allow for analysis that will not only increase the strength of any patent applications that are filed on the idea, but also increase the probability of earlier, successful patent prosecution. In addition, Tool 44 identifies technical fields that the U.S. Patent and Trademark Office and other competitors may search for prior art to be used against the patent application during prosecution or thereafter. How the IPAM server works in conjunction with the technology classification 212 to aid in the R&D Scale-up Stage is similar to how it works in the Idea Stage as described with reference to FIG. 21 above. The one exception is that the group searched in step 2102 is all patents and applications narrowed to reflect the developing product, but is not limited to this.

VII.   IPAM Server and Standard Industrial Codes (SIC) Classification

Referring to FIG. 2, IPAM server works in conjunction with the SIC classification 214 to facilitate the Preliminary Assessment Stage (as Tool 14), the Feasibility Stage (as Tool 25) and the Development Stage (as Tool 36).

5

A.   Preliminary Assessment Stage

FIG. 26 illustrates the SIC classification 214 facilitating the Preliminary Assessment Stage as Tool 14, entitled "A Chart of Related Markets." The purpose of Tool 14 in the Preliminary Assessment Stage is to provide the

10 necessary information to the project team to find other markets (or industries) which should be assessed by team members. In addition, Tool 14 identifies market (or industry) segments that could possibly use the product or service. The following Tools described in this section (Section VII) can easily be modified to allow the user to define the industry by companies by plotting the U.S. patent

15 classification for that industry (e.g., SIC classification). How the IPAM server works in conjunction with the SIC classification 214 to aid in the R&D Preliminary Assessment Stage is described with reference to FIG. 27.

In FIG. 27, a flowchart 2700 begins at step 2702. In step 2702, in an embodiment of the present invention a user performs a search on the group of all

20 U.S. patents, European patents, and European applications (and other available patents and/or applications). Here, because the user is just pointing at a broad field, the abstract of each patent and/or application is typically the section that is searched, but is not limited to this. Here, the search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of

25 patents and applications. Control passes to step 2704.

In step 2704, IPAM server takes the group of patents produced in step 2702 and further divides it into subgroups, with each subgroup having the same technology classification. When the search in step 2102 is on the group of U.S. patents, the classification used is the U.S. Patent Classification designated by the

U.S. Patent and Trademark Office. In a similar manner, if the search in step 2102 is on the group of International patents and applications, then the classification used would be the IPC classification. IPAM server may store the U.S. Patent Classification and IPC classification each as a meta-data field that will also need to be searched to determine the technology classification, but is not limited to this. Control then passes to step 2706.

In step 2706, each U.S. and IPC classification determined by step 2704 is mapped to its related SIC classification. Control then passes to step 2708.

In step 2708, IPAM server is used in conjunction with a SIC classification 214 to create a graphical representation of similar industrial markets. Typically, this is done by the user selecting a SIC classification function on the computer screen. The SIC classification 214 produced by Tool 14 (FIG. 26) shows the diverse markets (via SIC Classifications) that apply to the idea. The graphical representation in FIG. 26 is a pie chart. The present invention is not limited to using a pie chart.

Referring to FIG. 26, the SIC Classification 178 represents the most common market or industry that the idea is related to. SIC classification codes are provided by the U.S. Department of Commerce.

B.   Feasibility Stage

FIG. 28 illustrates the SIC classification 214 facilitating the Feasibility Stage as Tool 25, entitled "A Chart of Related Markets." The purpose of Tool 25 in the Feasibility Stage is to provide the necessary information to the project team as to what markets to check for lead customers to use the product or service (resulting from the initial idea). In addition, Tool 25 identifies market segments and lead customers that would first use the product or service. How the IPAM server works in conjunction with the SIC classification 214 to aid in the R&D Feasibility Stage is similar to how it works in the Preliminary Assessment Stage as described with reference to FIG. 27 above.

C. Development Stage

FIG. 29 illustrates the SIC classification 214 facilitating the Development Stage as Tool 36, entitled "A Chart of Related Markets." The purpose of Tool 36 in the Development Stage is to provide the necessary information to the project

5   team as to what markets are targets for sales growth after commercialization of the initial product. In addition, Tool 36 identifies market segments and customers that would later use the product or service. How the IPAM server works in conjunction with the SIC classification 214 to aid in the R&D Feasibility Stage is similar to how it works in the Preliminary Assessment Stage as described with

10   reference to FIG. 27 above. The one exception is that the group searched in step 2702 is all patents and applications narrowed to reflect project concept under development, but is not limited to this.

VIII. IPAM Server and Patent Count Per Year

15   Referring to FIG. 2, IPAM server works in conjunction with the patent count per year 216 to facilitate the Idea Stage (as Tool 5). FIG. 30 illustrates the count per year 216 facilitating the Idea Stage as Tool 5, entitled "Patent Activity Chart." As stated above, in the Idea Stage, the idea is expanded and is prepared for consideration as a formal project/product.

20   In FIG. 30, patent count per year 216 as Tool 5 is shown. The purpose of Tool 5 in the Idea Stage is to provide such information to the user/inventor so that he or she can time his or her efforts to match the general activity in the area of the idea. In addition, Tool 5 identifies speed of change in the environment surrounding the idea (i.e., the velocity and intensity of activity in the market).

25   How the IPAM server works in conjunction with the patent count per year 216 to aid in the R&D Idea Stage is described with reference to FIG. 31.

In FIG. 31, a flowchart 3100 begins at step 3102. In step 3102, in an embodiment of the present invention a user performs a search on the group of all U.S. patents. Here, because the user is just pointing at a broad field, the abstract

of each U.S. patent is typically the section that is searched, but is not limited to this. The present invention is not limited to doing the search on U.S. patents, but may include European, Japanese (and other available) patents and/or applications. Here, the search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 3104.

In step 3104, IPAM server is used in conjunction with patent count per year 216 to create a chart that indicates the top assignees/companies in a related area to the idea/subject searched in step 3102. Here, the group of patents produced in step 3102 are further divided into subgroups, with each subgroup having patents that were issued in the same year and relate to the idea. Typically, step 3104 is initiated by the user selecting a patent count per year function on the computer screen. At this point flowchart 3100 ends.

Following is a general discussion describing an example thought process of the user as he or she uses Tool 5 in the Idea Stage. Referring to FIG. 30, the idea relates to the microwave heating of food. The user may look at the chart and notice that through the mid-1980s there was slow and steady growth of patents being issued relating to microwave heating of food. This indicates there is a lot of art in that time frame. But, it also tells the user that it's an area of growth and people are still investing in it so if the user has a good idea, he or she should consider participating.

What the user sees in the years 1990 and 1991 is *doubling* of the activity from the year or two previous. This indicates that in 1990 and 1991, everyone jumped into the markets relating to the microwave heating of food. Again, unless the user has a very distinctive idea, he or she may decline to get into the market. Looking at the late 1990's it appears as if the market is declining. At this time it may not be a good business decision to pursue the idea of microwave heating of food.

IX.   IPAM Server and Patent Count Per Year

Referring to FIG. 2, IPAM server works in conjunction with the patent count per year 218 to facilitate the Preliminary Assessment Stage (as Tool 15), the Feasibility Stage (as Tool 26), the Development Stage (as Tool 37) and the Scale-up Stage (as Tool 45).   What these tools illustrate (in three dimensional form) what Tool 5 illustrated, as discussed above.

A.   Preliminary Assessment Stage

FIG. 32 illustrates the patent count per year 218 facilitating the Preliminary Assessment Stage as Tool 15, entitled "Recent Patent Activity Chart." The purpose of Tool 15 in the Preliminary Assessment Stage is provide information to the project team in terms of recent patent activity. Here, if there is heavy activity in recent years, the project team must consider whether the product/idea is distinctive enough to ensure commercial success. In addition, Tool 15 shows the intensity of recent effort in the project's environment.   How the IPAM server works in conjunction with the patent count per year 218 to aid in the R&D Preliminary Assessment Stage is described with reference to FIG. 33.

In FIG. 33, a flowchart 3300 begins at step 3302. In step 3302, in an embodiment of the present invention a user performs a search on the groups of all U.S., European (and other available) patents. Here, because the user is just pointing at a broad field, the abstract of each patent is typically the section that is searched, but is not limited to this. Here, the search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 3304.

In step 3304, the group of patents produced in step 3302 are further divided into subgroups, with each subgroup having the same assignee/company. IPAM server may store the assignee information of patents in a meta-data field that will also need to be searched to determine the assignee, but is not limited to this. Control then passes to step 3306.

In step 3306, each subgroup produced in step 3304 is further divided into subgroups by year. IPAM server may store the year information of patents in a meta-data field that will also need to be searched to determine the year, but is not limited to this. The flowchart 3300 ends at this point.

5

B.   Feasibility Stage

As shown in FIG. 2, the patent count per year 218, in conjunction with IPAM server, is also useful in the Feasibility Stage of the R&D process. In general, the Feasibility Stage tests whether a concept is validated in the laboratory and with at least one lead customer. The patent count per year 218, used in

10   conjunction with IPAM server, is shown in FIG. 34 as Tool 26, entitled "Recent Patent Activity Chart." The purpose of Tool 26 is to inform the project team of potential partners and competitors to investigate further. In addition, the chart shows intensity of recent effort in the project's environment.

How the IPAM server works in conjunction with the patent count per year

15   218 to aid in the R&D Feasibility Stage is similar to how it works in the Preliminary Assessment Stage as described with reference to FIG. 33 above. One exception is in step 3306. In the Preliminary Assessment Stage, all years we included in the chart. Here, only the last two years is typically included, but is not limited to this.

20   ### C.   Development Stage

As shown in FIG. 2, the patent count per year 218, in conjunction with IPAM server, is also useful in the Development Stage of the R&D process. The patent count per year 218, used in conjunction with IPAM server, is shown in FIG. 35 as Tool 37, entitled "Recent Patent Activity Chart." The purpose of Tool

25   37 is to inform the project team and competitive intelligence of which companies to watch or investigate for ongoing activity in the project area. In addition, the chart shows who has been active in the general project area.

How the IPAM server works in conjunction with the patent count per year 218 to aid in the R&D Development Stage is similar to how it works in the Preliminary Assessment Stage as described with reference to FIG. 33 above. One exception is in step 3306. In the Preliminary Assessment Stage, all years we included in the chart. Here, only the last year is typically included, but is not limited to this.

D.   Scale-up Stage

As shown in FIG. 2, the patent count per year 218, in conjunction with IPAM server, is also useful in the Scale-up Stage of the R&D process. The patent count per year 218, used in conjunction with IPAM server, is shown in FIG. 36 as Tool 45, entitled "Recent Patent Activity Chart." The purpose of Tool 45 is to inform the project team of which competitors to watch closely. In addition, the chart shows the intensity of very recent effort in the project's environment. How the IPAM server works in conjunction with the patent count per year 218 to aid in the R&D Scale-up Stage is similar to how it works in the Preliminary Assessment Stage as described with reference to FIG. 33 above.

X.   IPAM Server and Application Count Per Year

Referring to FIG. 2, IPAM server works in conjunction with the application count per year 220 to facilitate the Preliminary Assessment Stage (as Tool 16), the Feasibility Stage (as Tool 27), the Development Stage (as Tool 38) and the Scale-up Stage (as Tool 46).

A.   Preliminary Assessment Stage

FIG. 38 illustrates the application count per year 218 facilitating the Preliminary Assessment Stage as Tool 16, entitled "Recent Patent Application Chart." The purpose of Tool 16 in the Preliminary Assessment Stage is provide

information to the project team as to the potential partners and competitors to preliminarily assess. In addition, Tool 16 shows the intensity of recent effort in the project's environment. How the IPAM server works in conjunction with the application count per year 220 to aid in the R&D Preliminary Assessment Stage is described with reference to FIG. 39.

In FIG. 39, a flowchart 3900 begins at step 3902. In step 3902, in an embodiment of the present invention a user performs a search on the group of all European applications, but is not limited to this. Here, because the user is just pointing at a broad field, the abstract of each patent is typically the section that is searched, but is not limited to this. The search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of applications. Control passes to step 3904.

In step 3904, the group of applications patents produced in step 3902 are further divided into subgroups, with each subgroup having the same assignee/company. IPAM server may store the assignee information of applications in a meta-data field that will also need to be searched to determine the assignee, but is not limited to this. Control then passes to step 3906.

In step 3906, each subgroup produced in step 3904 is further divided into subgroups by year, where year is limited to the last four years. IPAM server may store the year information of applications in a meta-data field that will also need to be searched to determine the year, but is not limited to this. The flowchart 3900 ends at this point.

B.   Feasibility Stage

As shown in FIG. 2, the application count per year 220, in conjunction with IPAM server, is also useful in the Feasibility Stage of the R&D process. In general, the Feasibility Stage tests whether a concept is validated in the laboratory and with at least one lead customer. The application count per year 220, used in conjunction with IPAM server, is shown in FIG. 40 as Tool 27, entitled "Recent Patent Application Chart." The purpose of Tool 27 is to inform the project team

of potential partners and competitors to watch. In addition, the chart shows intensity of very recent effort in the project's environment.

How the IPAM server works in conjunction with the application count per year 220 to aid in the R&D Feasibility Stage is similar to how it works in the Preliminary Assessment Stage as described with reference to FIG. 39 above. One exception is in step 3906. In the Preliminary Assessment Stage, the last four years were included in the chart. Here, only the last two years are typically included, but it not limited to this.

C.   Development Stage

As shown in FIG. 2, the application count per year 220, in conjunction with IPAM server, is also useful in the Development Stage of the R&D process. The application count per year 220, used in conjunction with IPAM server, is shown in FIG. 41 as Tool 38, entitled "Recent Patent Application Chart." The purpose of Tool 38 is to inform the project team and competitive intelligence of which companies to watch for ongoing activity in the project area. In addition, the chart shows who has been active in the general project area.

How the IPAM server works in conjunction with the application count per year 220 to aid in the R&D Development Stage is similar to how it works in the Preliminary Assessment Stage as described with reference to FIG. 39 above. One exception is in step 3906. In the Preliminary Assessment Stage, the last four years were included in the chart. Here, only the last year is typically included, but is not limited to this.

D.   Scale-up Stage

As shown in FIG. 2, the application count per year 220, in conjunction with IPAM server, is also useful in the Scale-up Stage of the R&D process. The application count per year 220, used in conjunction with IPAM server, is shown in FIG. 42 as Tool 46, entitled "Recent Patent Application Chart." The purpose

of Tool 46 is to inform the project team of potential partners and competitors to watch closely. In addition, the chart shows the intensity of very recent efforts in the project's environment.

How the IPAM server works in conjunction with the application count per year 220 to aid in the R&D Scale-up Stage is similar to how it works in the Preliminary Assessment Stage as described with reference to FIG. 39 above. One exception is in step 3906. In the Preliminary Assessment Stage, the last four years were included in the chart. Here, only the last year is typically included, but is not limited to this.

XI.   IPAM Server and Technology by Company Map

Referring to FIG. 2, IPAM server works in conjunction with the technology by company map 222 to facilitate the Idea Stage (as Tool 6), the Preliminary Assessment Stage (as Tool 17), the Feasibility Stage (as Tool 28), the Development Stage (as Tool 39) and the Scale-up Stage (as Tool 47).

A.   Idea Stage

FIG. 43 illustrates the technology by company map 222 facilitating the Idea Stage as Tool 6, entitled "Chart Narrowing Areas to Explore." As stated above, in the Idea Stage, the idea is expanded and is prepared for consideration as a formal project/product.

In FIG. 43, technology by company map 222 as Tool 6 is shown. The purpose of Tool 6 in the Idea Stage is to provide the necessary information to the user (e.g., inventor of the idea) as to which competitors have put forth major effort in areas related to the idea. In addition, Tool 6 focuses on what areas are being explored by which companies. This provides more directed information because it visually displays patent counts of particular companies. How the IPAM server works in conjunction with the technology by company map 222 to aid in the R&D Idea Stage is described with reference to FIG. 44.

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In FIG. 44, a flowchart 4400 begins at step 4402. In step 4402, in an embodiment of the present invention a user performs a search on the group of all U.S. patents. Here, because the user is just pointing at a broad field, the abstract of each U.S. patent is typically the section that is searched, but is not limited to this. The present invention is not limited to doing the search on U.S. patents, but may include European, Japanese (and other available) patents and/or applications. Here, the search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 4404.

In step 4404, IPAM server takes the group of patents produced in step 4402 and further divides it into subgroups, with each subgroup having the same patent classification. When the search in step 4402 is on the group of U.S. patents, the classification used is the U.S. Patent Classification designated by the U.S. Patent and Trademark Office. In a similar manner, if the search in step 4402 is on the group of International patents, then the classification used would be the IPC classification. IPAM server may store the U.S. Patent Classification (or IPC classification) in a meta-data field that will also need to be searched to determine the patent classification, but is not limited to this. Control then passes to step 4406.

In step 4406, each subgroup produced in step 4404 is further divided by assignee/company. Thus, IPAM server is used in conjunction with a technology by company map 222 to create a graphical representation of company and technical area by frequency. Typically, this is done by the user selecting a technology by company function on the computer screen. The flowchart 4400 ends at this point.

Referring again to FIG. 43, the chart produced by Tool 6 tells the user several things. First, it shows that companies like AT&T Bell Laboratories and International Business Machines Corporation are active in the area of the idea but have a broader set of activity (as represented by several patents in several different patent classifications). Companies, like Westinghouse Electric Corporation, appear to be targeting specific areas (as represented by many patents in one patent classification).

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B. Preliminary Assessment Stage

FIG. 45 illustrates the technology by company map 222 facilitating the Preliminary Assessment Stage as Tool 17, entitled "A Chart of Other Company's Work Related to the Project Goal." The purpose of Tool17 in the Preliminary Assessment Stage is to provide the necessary information to the user as to which areas and what companies to track during the project. In addition, Tool 17 assesses serious competitors and possible partners in a new technology or market. How the IPAM server works in conjunction with the technology by company map 222 to aid in the R&D Preliminary Assessment Stage is similar to how it works in the Idea Stage as described with reference to FIG. 44. One exception is in step 4402. In the Idea Stage, only U.S. patents were searched in step 4402. In the Preliminary Assessment Stage all U.S. patents, European patents and European applications (and other available patents and/or applications) are searched, but is not limited to this.

C. Feasibility Stage

FIG. 46 illustrates the technology by company map 222 facilitating the Feasibility Stage as Tool 28, entitled "A Chart Narrowing Areas to Explore." The purpose of Tool 28 in the Feasibility Stage is to provide the project team with the companies to approach and avoid for each technical area. In addition, Tool 28 assesses the feasibility of serious competition and possible partners for the project. How the IPAM server works in conjunction with the technology by company map 222 to aid in the R&D Feasibility Stage is similar to how it works in the Idea Stage as described with reference to FIG. 44. One exception is in step 4402. In the Idea Stage, only U.S. patents were searched in step 4402. In the Feasibility Stage all U.S. patents, European, Japanese, and any other, patents and applications are searched, but is not limited to this.

D.   Development Stage

FIG. 47 illustrates the technology by company map 222 facilitating the Development Stage as Tool 39, entitled "A Chart Showing Areas to Lock-Up or Lock-Out." The purpose of Tool 39 in the Development Stage is to determine whether the project has appropriate intellectual property to protect sales margin. In addition, Tool 39 helps the project team steer the development of the product clear of serious competition and complete research needed for blocking applications and publications. How the IPAM server works in conjunction with the technology by company map 222 to aid in the R&D Development Stage is similar to how it works in the Idea Stage as described with reference to FIG. 44. One exception is in step 4402. In the Idea Stage, only U.S. patents were searched in step 4402. In the Development Stage all U.S., European, Japanese, and any other, patents and applications searched are narrowed to reflect the project concept under development, but is not limited to this.

E..   Scale-up Stage

FIG. 48 illustrates the technology by company map 222 facilitating the Scale-up Stage as Tool 47, entitled "A Chart Narrowing Areas to Explore." The purpose of Tool 47 in the Scale-up Stage is to show patent attorneys, inventors, and patent committees which areas and what companies to watch. In addition, Tool 47 shows how to steer patent prosecution around serious competition and file blocking applications. Tool 47 can also be used to highlight who might file interference or opposition proceedings on any patent application filed. How the IPAM server works in conjunction with the technology by company map 222 to aid in the R&D Scale-up Stage is similar to how it works in the Idea Stage as described with reference to FIG. 44. One exception is in step 4402. In the Idea Stage, only U.S. patents were searched in step 4402. In the Scale-up Stage all U.S., European, Japanese, and other available, patents and applications searched are narrowed to reflect the developing product, but is not limited to this.

XII.   IPAM Server and Patent Citation Tree

Referring to FIG. 2, IPAM server works in conjunction with the patent citation tree 224 to facilitate the Idea Stage (as Tool 7), the Preliminary Assessment Stage (as Tool 18), the Feasibility Stage (as Tool 29) and the Development Stage (as Tool 40). Citation trees are described in detail in the patent and applications referenced above in the section entitled "Cross-Reference to Other Patents and Applications." In general, during an R & D project, the user can look at the patent citation tree 224 to decide how crowded the area is and how quickly it is moving (note that the icons can display dates relevant to the patents in the tree). The invention automatically displays contour maps that connect patents having the same dates, assignees, classifications, etc., upon user command. In the map, the greatest gradient is the highest change and so you can use that as a way to plot the velocity in different directions. Thus, the contour lines can show the time line for the subject areas, and how fast they are developing.

A.   Idea Stage

FIG. 49 illustrates the patent citation tree 224, used in the Idea Stage, as Tool 7, entitled "A Citation Tree Showing Idea's Environment." The purpose of Tool 7 in the Idea Stage is to provide information to the user (inventor) as to how expansive and inter-related the technology is. This shows uniqueness of the idea and maturity of the technology. In addition, the user will be able to tell whether or not to promote the idea. Further, the patent citation tree 224 focuses on which areas are being explored by what companies and identifies which patents would be prior art for the new idea. How the IPAM server works in conjunction with the patent citation tree 224 to aid in the R&D Idea Stage is described with reference to FIG. 50.

In FIG. 50, a flowchart 5000 begins at step 5002. In step 5002, in an embodiment of the present invention a user performs a search on the group of all

U.S. patents. Here, because the user is just pointing at a broad field, the abstract of each U.S. patent is typically the section that is searched, but is not limited to this. The present invention is not limited to doing the search on U.S. patents, but may include European, Japanese (and other available) patents and/or applications. Here, the search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 5004.

In step 5004, IPAM server takes the group of patents produced in step 5002 and further performs a forward citation on each of the patents to create a patent citation tree 224. Forward citations are described in detail in the patent and applications referenced above in the section entitled "Cross-Reference to Other Patents and Applications." The nodes in the patent citation tree 224 may be color coded by assignee to allow the user to pick out color patterns easily. The flowchart 5000 ends at this point.

B. *Preliminary Assessment Stage*

FIG. 51 illustrates the patent citation tree 224, used in the Preliminary Assessment Stage, as Tool 18, entitled "A Citation Tree Showing Concept's History." The purpose of Tool 18 in the Preliminary Assessment Stage is to provide information to the project team on how expansive and inter-related the technology and markets are. In addition, the user will be able to tell whether or not to promote the idea. Further, the patent citation tree 224 focuses on other technical and market areas that are being explored, and by which companies. The nodes in the patent citation tree 224 may be color coded by assignee to allow the user to pick out color patterns easily. How the IPAM server works in conjunction with the patent citation tree 224 to aid in the R&D Preliminary Assessment Stage is similar to how it is done in the Idea Stage as described with reference to FIG. 50.

C.   Feasibility Stage

FIG. 52 illustrates the patent citation tree 224, used in the Feasibility Stage, as Tool 29, entitled "A Citation Tree Showing Project's Prior Art." The purpose of Tool 29 in the Feasibility Stage is to provide information to the project team on how to work around prior art problems early in the development process. Further, the patent citation tree 224 focuses the project team on patents that must be respected as feasibility of the project is established. The nodes in the patent citation tree 224 may be color coded by assignee and/or by freedom to practice to allow the user to pick out color patterns easily. How the IPAM server works in conjunction with the patent citation tree 224 to aid in the R&D Feasibility Stage is similar to how it is done in the Idea Stage as described with reference to FIG. 50.

D.   Development Stage

FIG. 53 illustrates the patent citation tree 224, used in the Development Stage, as Tool 40, entitled "A Citation Tree Showing Project's IP Position." The purpose of Tool 40 in the Development Stage is to provide information to the project team on what key prior art to acquire during the development phase for freedom to practice and to block competition. Further, the patent citation tree 224 focuses the project team on patents that must which could be key to blocking competitive approaches. The nodes in the patent citation tree 224 may be color coded by assignee and/or by freedom to practice to allow the user to pick out color patterns easily. How the IPAM server works in conjunction with the patent citation tree 224 to aid in the R&D Feasibility Stage is similar to how it is done in the Idea Stage as described with reference to FIG. 50.

XIII.   IPAM Server and Nested Patent Citation Tree

Referring to FIG. 2, IPAM server works in conjunction with the nested patent citation tree 226 to facilitate the Idea Stage (as Tool 8), the Preliminary Assessment Stage (as Tool 19), the Feasibility Stage (as Tool 30), the Development Stage (as Tool 41), and the Scale-up Stage (as Tool 48). Nested patent citation trees are described in detail in the patent and applications referenced above in the section entitled "Cross-Reference to Other Patents and Applications." In general, during an R & D project, the user can look at the nested patent citation tree 226 to promote his idea as distinct from other on-going work.   Patents lag the technology due to the inherent delays in patent prosecution. Thus, if the user finds a very recent patent, it may not have any forward citations since any patents that might cite it are months or years away from issuing. Thus, it would not be possible to see how the technology is developing relative to this patent since it has no forward citations.

This tool utilizes a technique that involves going back one or more generations from a given patent, and then performing forward citations on the prior generations. This identifies a patent family that is a result of a unique combination of backwards and forwards citation processing. The resulting tree tells you who's playing and in what fields that's probably around the base patent. It's an approach to look into the future of a given technology (how the technology may develop in the future). Date contours (or contours according to some other criteria) is also applicable with this tool (and with all hyperbolic trees generated by the invention).

A.   Idea Stage

FIG. 54 illustrates the nested patent citation tree 226, used in the Idea Stage, as Tool 8, entitled "A Citation Root-Tree Showing Idea's Environment." The purpose of Tool 8 in the Idea Stage is to provide information to the user (inventor) so as to allow the user to promote his idea as distinct from other on-

going work. The nested patent citation tree 226 predicts related areas that are possibly under exploration by other companies. How the IPAM server works in conjunction with the nested patent citation tree 226 to aid in the R&D Idea Stage is described with reference to FIG. 55.

In FIG. 55, a flowchart 5500 begins at step 5502. In step 5502, in an embodiment of the present invention a user performs a search on the group of all U.S. patents. The present invention is not limited to doing the search on U.S. patents, but may include European, Japanese (and other available) patents and/or applications. The search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 5504.

In step 5504, the IPAM server determines the prior generation patent of each patent produced in step 5502 (e.g., goes back one citation for each patent). Control passes to step 5506.

In step 5506, IPAM server takes the group of patents produced in step 5002 and further performs three forward citations on each of the patents to create a nested patent citation tree 226. The nodes in the patent citation tree 224 may be color coded by assignee to allow the user to pick out color patterns easily. The flowchart 5500 ends at this point.

B.   Preliminary Assessment Stage

FIG. 56 illustrates the nested patent citation tree 226, used in the Preliminary Assessment Stage, as Tool 19, entitled "A Citation Root-Tree Showing Concept's Environment." The purpose of Tool 19 in the Preliminary Assessment Stage is to provide information to the project team so it can predict if there are possibly other competing technologies and markets that are under development. Further, the nested patent citation tree 226 (i.e., citation root-tree) focuses on technical and market areas which are being explored by others. The nodes in the patent citation tree 224 may be color coded by assignee to allow the user to pick out color patterns easily. How the IPAM server works in conjunction

with the nested patent citation tree 226 to aid in the R&D Preliminary Assessment Stage is similar to the Idea Stage as described with reference to FIG. 55.

C.   *Feasibility Stage*

FIG. 57 illustrates the nested patent citation tree 226, used in the Feasibility Stage, as Tool 30, entitled "A Citation Root-Tree Showing Competitive Environment." The purpose of Tool 30 in the Feasibility Stage is to provide information to the project team so it knows early on possible competitive activities that it must address in its project plan. The nested patent citation tree 226 (i.e., citation root-tree) indicates to the competitive intelligence group which companies a preliminary investigation should be conducted on. The nodes in the patent citation tree 224 may be color coded by assignee and/or by freedom to practice to allow the user to pick out color patterns easily. How the IPAM server works in conjunction with the nested patent citation tree 226 to aid in the R&D Feasibility Stage is similar to the Idea Stage as described with reference to FIG. 55.

D.   *Development Stage*

FIG. 58 illustrates the nested patent citation tree 226, used in the Development Stage, as Tool 41, entitled "A Citation Root-Tree Showing Project's IP Position." The purpose of Tool 41 in the Development Stage is to provide information to the project team so it knows whether its development and project timing are likely to yield a commercial competitive success. The continuous updating of the nested patent citation tree 226 (i.e., citation root-tree) shows which companies the competitive intelligence group must follow in detail. The nodes in the patent citation tree 224 may be color coded by assignee and/or by freedom to practice to allow the user to pick out color patterns easily. How the IPAM server works in conjunction with the nested patent citation tree 226 to

aid in the R&D Development Stage is similar to the Idea Stage as described with reference to FIG. 55.

E.   Scale-up Stage

FIG. 59 illustrates the nested patent citation tree 226, used in the Scale-up Stage, as Tool 48, entitled "A Citation Root-Tree To Time Project's IP Filings." The purpose of Tool 48 in the Scale-up Stage is to provide information to the project team so it can time scale-up activities and filing of patents to ward off competition. The continuous updating of the nested patent citation tree 226 (i.e., citation root-tree) shows new work the competitive intelligence group must immediately check out to protect scale-up activities. The nodes in the patent citation tree 224 may be color coded by assignee and/or by freedom to practice to allow the user to pick out color patterns easily. How the IPAM server works in conjunction with the nested patent citation tree 226 to aid in the R&D Scale-up Stage is similar to the Idea Stage as described with reference to FIG. 55.

XIV.   IPAM Server and Product/Patent/Revenue Table

In FIG. 60, IPAM server works in conjunction with the product/patent/revenue table 228 to facilitate the Portfolio Stage (as Tool 52). FIG. 60 illustrates the product/patent/revenue table 228, used in the Portfolio Stage, as Tool 52, entitled "Proposed Features Map in the Context of all Possibilities." The purpose of Tool 52 is make the proposed projects' new features stand out from what exists today. Tool 52 highlights distinctive features needed by customers. How the IPAM server works in conjunction with the product/patent/revenue table 228 to aid in the Portfolio Stage is described with reference to FIG. 61.

In FIG. 61, a flowchart 6100 begins at step 6102. In step 6102, in an embodiment of the present invention a user performs a search on the group of company documents and patents, but is not limited to this. This typically involves

a boolean and/or natural language search on the idea/subject to produce a group of documents and patents. Control passes to step 6104.

In step 6104, the IPAM server sorts the resulting group of documents and patents from step 6102 by product attributes. The flowchart 6100 ends.

5   ### XV.   IPAM Server and Patent/Months to Issue Chart

Referring to FIG. 2, IPAM server works in conjunction with the patent/months to issue chart 230 to facilitate the Feasibility Stage (as Tool 31), the Development Stage (as Tool 42), the Scale-up Stage (as Tool 49) and the Portfolio Stage (as Tool 54). In general, during an R & D project, the user can

10   look at the patent/months to issue chart 230 to determine the average time that competitor's patents are in prosecution. Patents lag the technology due to the inherent delays in patent prosecution. Delays in prosecution may be different for different technologies. Therefore, the user can also use the patent/months to issue chart 230 to get an idea on the prosecution time for different technologies. This

15   also can help to predict the pace of certain technologies and what competitors are working on in their labs.

A.   Feasibility Stage

20   FIG. 62 illustrates the patent/months to issue chart 230, used in the Feasibility Stage, as Tool 31, entitled "Cycle Time for Patent Prosecution." The purpose of Tool 31 in the Feasibility Stage is to provide information to the project team so it knows the timing risks of the project based on the average prosecution time for U.S. patents related to a certain technology. The patent/months to issue

25   chart 230 shows the average time all potential competitors' submarine patents remain hidden from the project team's view. How the IPAM server works in conjunction with the patent/months to issue chart 230 to aid in the R&D Feasibility Stage is described next with reference to FIG. 63.

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In FIG. 63, a flowchart 6300 begins at step 6302. In step 6302, in an embodiment of the present invention a user performs a search on the group of all U.S. patents. The present invention is not limited to doing the search on U.S. patents, but may include European, Japanese (and other available) patents and/or applications. The search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents. Control passes to step 6304.

In step 6304, IPAM server sorts the patents in the resulting group from step 6302 by year to create subgroups of patents. Control passes to step 6306.

In step 6306, IPAM server, for each patent in each of the subgroups created in step 6304, subtracts the patent's issue date from its filing date. Control then passes to step 6308.

In step 6308, IPAM server calculates, for each subgroup of patents, the average prosecution time for its patents and displays the results to the user. Flowchart 6300 ends at this point.

B. Development Stage

FIG. 64 illustrates the patent/months to issue chart 230, used in the Development Stage, as Tool 42, entitled "Cycle Time for Patent Prosecution." The purpose of Tool 42 in the Development Stage is to provide information to the project team so it knows the timing risks of the project based on competitors' upcoming patents. The patent/months to issue chart 230 also shows the high, low, and average time a specific competitor's patents remain hidden from the project team's view. How the IPAM server works in conjunction with the patent/months to issue chart 230 to aid in the R&D Development Stage is similar to the Feasibility Stage, as described above with reference to FIG. 63.

C.   *Scale-up Stage*

FIG. 65 illustrates the patent/months to issue chart 230, used in the Scale-up Stage, as Tool 42, entitled "Cycle Time for Patent Prosecution." The purpose of Tool 49 in the Scale-up Stage is to provide information to the project team so it knows when to file its own U.S. patent applications. The patent/months to issue chart 230 also shows the high, low, and average time top competitor's patents remain hidden from the project team's view. How the IPAM server works in conjunction with the patent/months to issue chart 230 to aid in the R&D Scale-up Stage is similar to the Feasibility Stage, as described above with reference to FIG. 63.

D.   *Portfolio Stage*

FIG. 66 illustrates the patent/months to issue chart 230, used in the Portfolio Stage, as Tool 54, entitled "Cycle Time for Patent Prosecution." The purpose of Tool 54 in the Portfolio Stage is to provide information to R&D management so it can take steps to bring the timing of their U.S. patents/applications into sync with European applications. The patent/months to issue chart 230 also shows the high, low, and average time the company's patents take to issue. How the IPAM server works in conjunction with the patent/months to issue chart 230 to aid in the R&D Portfolio Stage is similar to the Feasibility Stage, as described above with reference to FIG. 63. One exception is that the search is more focused on the company's U.S. patents, but is not limited to this.

XVI.   *IPAM Server and Document/Annotation*

Referring to FIG. 2, IPAM server works in conjunction with the document/annotation 232 to facilitate the Idea Stage (as Tool 9), the Preliminary Assessment Stage (as Tool 20), the Feasibility Stage (as Tool 32), the Development Stage (as Tool 43), the Scale-up Stage (as Tool 50) and the

Portfolio Stage (as Tool 55). Document annotation by IPAM server is described in detail in the patent and applications referenced above in the section entitled "Cross-Reference to Other Patents and Applications." In general, during the different stages of an R & D project, the user can utilize the document/annotation 232 to help create a document trail. For example, in the Idea Stage any notes or annotations create by the user/inventor for an idea will help to establish priority dates in the future as needed.

A.   Idea Stage

FIG. 67 illustrates the document/annotation 232, used in the Idea Stage, as Tool 9, entitled "Notes to Document Thoughts and Analysis." The purpose of Tool 9 in the Idea Stage is to start creating a "document trail" of the invention at the same time the idea is researched, thus giving as early of a priority date as possible. The document/annotation 232 provides recorded, indexed knowledge for further reference by the creator or by other colleagues. How the IPAM server works in conjunction with the document/annotation 232 to aid in the R&D Idea Stage is described next with reference to FIG. 68.

In FIG. 68, a flowchart 6800 begins at step 6802. In step 6802, in an embodiment of the present invention a user performs a search on the groups of patents and corporate documents, but is not limited to this. The search performed is typically a boolean and/or natural language search on the idea/subject to produce a group of patents and/or corporate documents. Control passes to step 6804.

In step 6804, IPAM server allows the user to make annotations on one or more of the patents and/or corporate documents in the group produced by step 6802. Flowchart 6800 ends at this point.

B.   Preliminary Assessment Stage

FIG. 69 illustrates the document/annotation 232, used in the Preliminary Assessment Stage, as Tool 20, entitled "Notes to Document Thoughts and Analysis." The purpose of Tool 20 in the Preliminary Assessment Stage is to create the documentation of the continuous effort to reduce the idea to practice and to obtain patent protection. The document/annotation 232 provides recorded, indexed knowledge for further reference by the project team members, management and patent attorneys. How the IPAM server works in conjunction with the document/annotation 232 to aid in the R&D Preliminary Assessment Stage is similar to how it is done in the Idea Stage, as described above with reference to FIG. 68.

C.   Feasibility Stage

FIG. 70 illustrates the document/annotation 232, used in the Feasibility Stage, as Tool 32, entitled "Notes to Document Thoughts and Analysis." The purpose of Tool 32 in the Feasibility Stage is to create the documentation of the continuous effort to reduce the idea to practice and to obtain patent protection. The document/annotation 232 provides recorded, indexed knowledge for further reference by the project team members, management and patent attorneys. How the IPAM server works in conjunction with the document/annotation 232 to aid in the R&D Feasibility Stage is similar to how it is done in the Idea Stage, as described above with reference to FIG. 68.

D.   Development Stage

FIG. 71 illustrates the document/annotation 232, used in the Development Stage, as Tool 43, entitled "Notes to Support U.S. Patent Application Preparation." The purpose of Tool 43 in the Development Stage is to create the documentation of the continuous effort to reduce the idea to practice and to

obtain patent protection. The document/annotation 232 provides recorded, indexed knowledge for further reference by the project team members, management and patent attorneys. How the IPAM server works in conjunction with the document/annotation 232 to aid in the R&D Development Stage is

5   similar to how it is done in the Idea Stage, as described above with reference to FIG. 68.

E.   Scale-up Stage

FIG. 72 illustrates the document/annotation 232, used in the Scale-up Stage, as Tool 50, entitled "Notes to Document Thoughts and Support U.S.

10   Patent Prosecution and Foreign Filings." The purpose of Tool 50 in the Scale-up Stage is to use recorded, indexed knowledge to expedite the preparation of patent applications, whereby reducing the cost and time The document/annotation 232 provides recorded, indexed knowledge for reference by inventors and patent attorneys. How the IPAM server works in conjunction with the

15   document/annotation 232 to aid in the R&D Scale-up Stage is similar to how it is done in the Idea Stage, as described above with reference to FIG. 68. One exception is that the groups of patents and applications searched are narrowed to only include those that reflect the developing product, but is not limited to this.
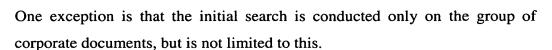
F.   Portfolio Stage

20   FIG. 73 illustrates the document/annotation 232, used in the Portfolio Stage, as Tool 55, entitled "Notes to Document Meeting Thoughts and Analysis." The purpose of Tool 55 in the Portfolio Stage is to improve decision quality through decision assumptions that are made available for future reviews. The document/annotation 232 provides recorded, indexed knowledge for future

25   reference by project and portfolio review teams. How the IPAM server works in conjunction with the document/annotation 232 to aid in the R&D Stage is similar to how it is done in the Idea Stage, as described above with reference to FIG. 68.

One exception is that the initial search is conducted only on the group of corporate documents, but is not limited to this.

XVII. Combination of the Tools or Methods

It is important to note that most, if not all, of the tools or methods described above may be combined to interactively go back and forth between different tools. Note that in the Idea Stage, a user may decided to combine or integrate one or more tools to facilitate the stage. For example, once the group of patents (from the search in step 1002 in FIG. 1) is divided into subgroups (in step 1004 in FIG. 1), the user may use Tool 1 to produce the topographic map 202 and/or Tool 2 to produce the top company table 204, or vice versa. The integration of tools discussed herein to facilitate the R&D stages is limitless.

XVIII. Conclusion

While various application embodiments of the present invention have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of the present invention should not be limited by any of the above-described exemplary embodiments.

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